FOURTH YEAR

Cellular Mobile Networks	COE403
Prerequisite: COE302 and COE309	(2-2-0-0)

Cellular Overview: History of Mobile Communications, Evolution of Cellular: from pre-1G to 4G, Licensing Issues. Cellular Concept and Design: Hexagons and Channelization. Handoff, Interference vs. Capacity, Trunking, Grade of Service, Erlang Computations Cell Splitting and Sectoring. Mobile Signals Propagation: Basic Equations and Mechanisms, Free Space Loss, Flat Earth Loss, Diffraction and Scattering, Longley-Rice and OH Loss Models, Okamura-Hata, COST-231, and Extensions, Walfisch, Ikagami, and Bertoni. Small Scale Fading and Multipath: Doppler Shift, Impulse Response and the Cellular Channel, Time Dispersion and Flat vs Frequency Selective Fading, Coherence Time and Fast vs Slow Fading, Rayleigh and Ricean Distributions, Fading Statistics. Evolution to Modern Systems: Diversity and Downtilting, CDMA and Processing Gain, CDMA Capacity Calculations, OFDMA Concepts, LTE and Frequency Reuse, MIMO and Beamforming.